CANDELA

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Smart Building Technologies

WIRELESS SMART CITY PLATFORM

candela

Cities around the world continue to grow day by day. With this growth, urban lighting systems are also rapidly evolving.

The expansion of cities not only leads to increased energy needs and costs but also causes significant challenges in managing logistics, operations, and maintenance services. Stricter regulations and growing public awareness about the importance of environmentally friendly and sustainable practices are pushing local governments to find ways to minimize the negative impacts of cities on our planet and reduce energy costs.

Thanks to modern and eco-friendly smart lighting technologies, it is now possible to control these adverse impacts and costs with **next-generation street and park/garden lighting solutions** that offer much more than conventional lighting.

Street and park/garden lighting is a crucial aspect of urban life, with street lighting alone consuming **approximately 40%** of a city's total electricity costs.

By implementing smart technology-supported lighting systems, you can achieve energy savings, reduce maintenance and operational costs, enhance the appeal of cities, and strengthen the perception of safety in urban environments.

It is predicted that approximately 70% of the world's population will live in cities by 2030.

%40
Street lighting consumes about 40% of a city's overall electricity cost.

%78
Cities consume 78% of the energy consumed in the world.

CO₂
Cities produce more than 60% of the carbon dioxide generated in the world.

What candela Solutions Offer?

Candela is a wireless smart city management platform specifically designed for urban lighting automation.

Its multi-layered system structure, consisting of a Central Control Unit (MKB), Regional Control Units (BKBs), and Endpoint Control Units (UKBs), enables centralized and regional management of city lighting in projects of varying scales.
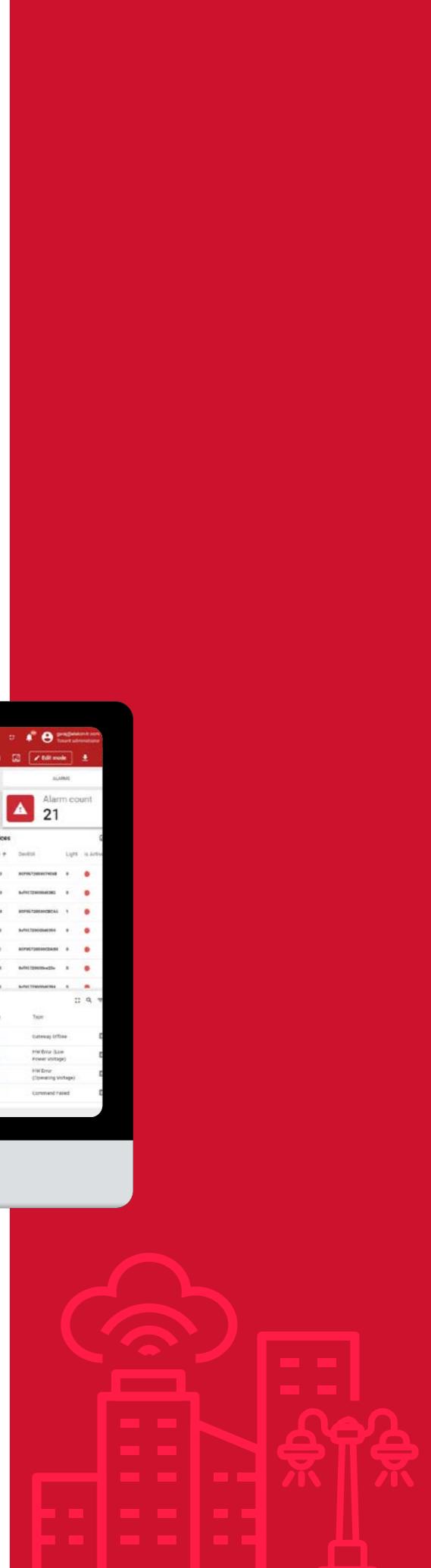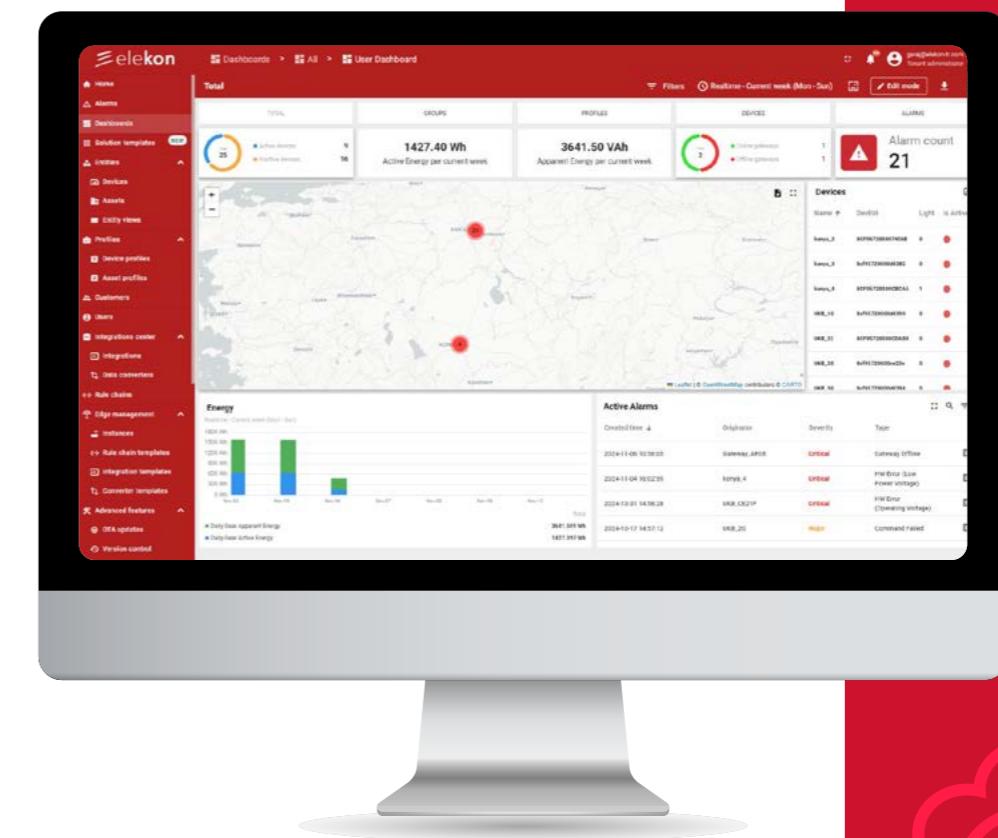
Advantages of the System

Lighting Control

The Candela system supports DALI and DALI2 open protocols, **enabling on/off and dimming control of lighting fixtures.** Thanks to the DALI protocol, users can manage lighting fixtures that are compatible with DALI drivers from different brands. Each fixture can be controlled individually or on a group basis. Additionally, easy connectivity is ensured through Zhaga and NEMA standard connection connectors.

Energy Saving

Candela enables significant energy savings by dimming wireless lighting fixtures in open and wide areas. Analyses show that **energy savings of up to 70%** can be achieved through scenarios created with lighting fixtures featuring DALI interfaces.

Simple Operation and Maintenance

Real-time device fault and alarm information can be **automatically** sent to the email and SMS groups of relevant management units. Additionally, processes such as creating fault reports and tracking spare parts can be easily managed through the centralized system.

Reporting

The Candela reporting module provides operational teams with detailed data on energy consumption, fault tracking, and inventory management. Users can generate reports on topics such as the energy consumption of each fixture and the total energy savings achieved to evaluate the system's performance. These reports play a crucial role in shaping strategic decisions aimed at improving energy efficiency in the future.

Scalability

Thanks to IoT technologies, the system is designed to be fully **expandable**. The limit point theoretically does not exist and only limited by your own imagination.

System Integration

Candela **can be integrated with other smart city systems** through its API interface and MQTT protocol. This makes urban lighting management smarter and more sustainable. By leveraging integration, users can enhance the overall efficiency of the system, making city infrastructure more functional.

Security

Candela helps **enhance urban safety** through effective lighting management. With flexible street lighting, "dark corners" and intersections can be illuminated, improving road and street safety. Additionally, the system employs a dual-layer AES-128 encryption mechanism for communication, ensuring maximum **data security.**

Application Areas

Candela IoT interface units enable centralized monitoring of fault and alarm information for systems such as **elevators, escalators, doors, and manholes** located in various city locations.

Additionally, it allows for the monitoring and analysis of data affecting quality of life, such as **air quality, temperature, and noise levels.** This capability helps enhance the overall quality of life in cities.

Wireless Communication

Candela ensures robust and uninterrupted connectivity by utilizing the wireless long-range protocol **LoRaWAN.**

LoRaWAN technology is supported by a 128-bit AES encryption system for secure end-to-end communication. Operating within standard ISM bands of various countries, it is compatible with different frequency plans such as **EU863-870** and **US902-928**. This flexibility guarantees the system's global integration and sustainable performance.

System Architecture

Central Control Unit (MKB)

The Central Control Unit (MKB) is the main platform where the entire lighting control infrastructure is managed. Through the MKB, users can monitor the system's status, modify settings, and manage lighting scenarios. The MKB offers remote monitoring and analysis capabilities with a **cloud-based** option while also being compatible with local (on-premises) systems. Cloud-based operation ensures secure storage and access to data.

Regional Control Units/Gateway (BKB)

Regional Control Units (BKBs) manage the control of lighting fixtures within specific areas, such as designated city zones. Each BKB can communicate with **up to 600 Endpoint Control Units (UKBs) within a range of 5-7 kilometers.** These units enhance the overall performance of the system by managing connectivity and data transmission over large areas, enabling centralized lighting control within a structured framework.

Endpoint Control Units (UKB):

Endpoint Control Units (UKBs) are devices directly connected to the lighting fixtures. **Each UKB controls the fixtures it is linked to**, adjusting lighting levels according to predefined scenarios. Operating in compliance with the DALI standard, UKBs enable real-time data exchange with the fixtures and apply dimming settings as needed.

Features of the System

- Graphical Display
- Energy Monitoring
- Smart Dimming
- Relay Switching
- Calendar Profiles

- Astronomical Time Clock
- Inventory Monitoring
- Predictive Maintenance
- Easy Commissioning
- IOT Interface Units

- Additional Sensor Integration Interfaces
- Open Protocol Support
- Wireless Communication
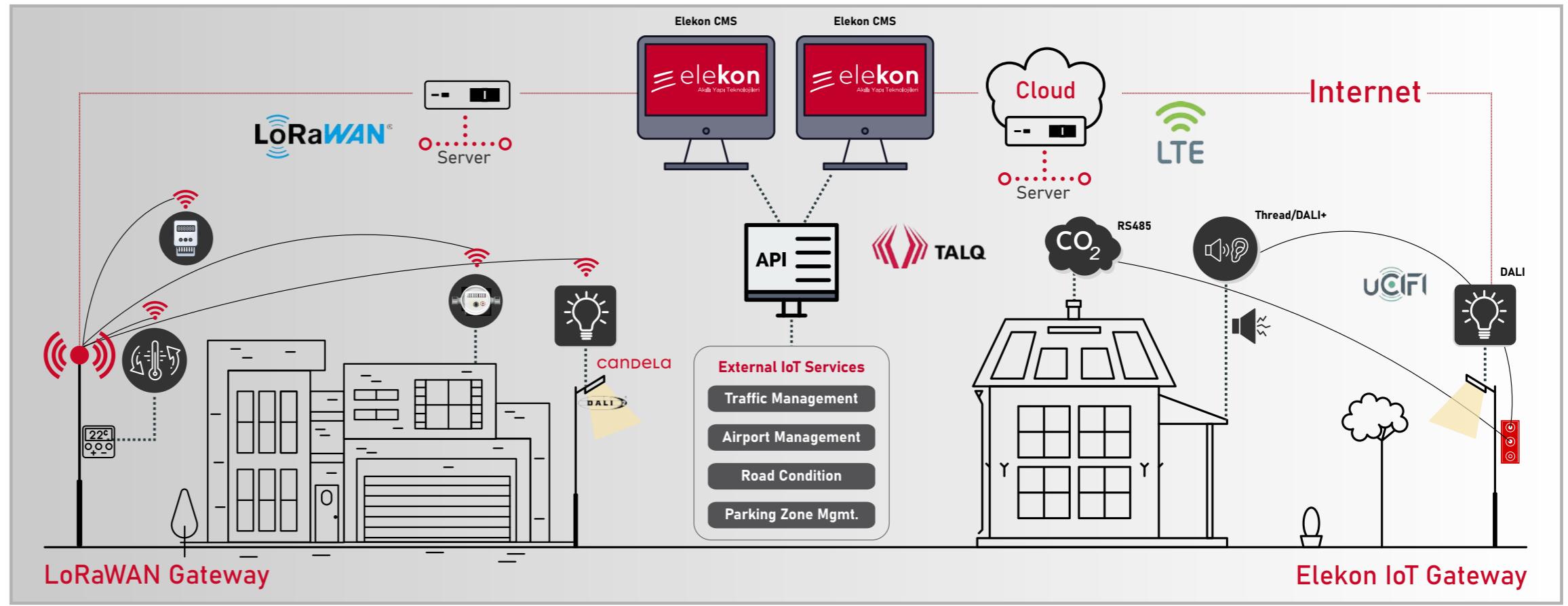
Operating Profiles

The Candela system offers two main operating profiles:

1. Manual Profile:

The user sends a direct command to the fixture, which operates according to the given command and continues with the current settings **until a new command is issued.**

This profile facilitates commissioning, maintenance, and testing processes, ensuring ease of operation.

2. Automatic Profile:

The system operates automatically by referencing **astronomical time** schedules, such as sunrise and sunset, real-time calendar data, or user-defined time intervals.

Fixtures deliver the desired lighting levels within the specified time periods without requiring manual intervention from the user.
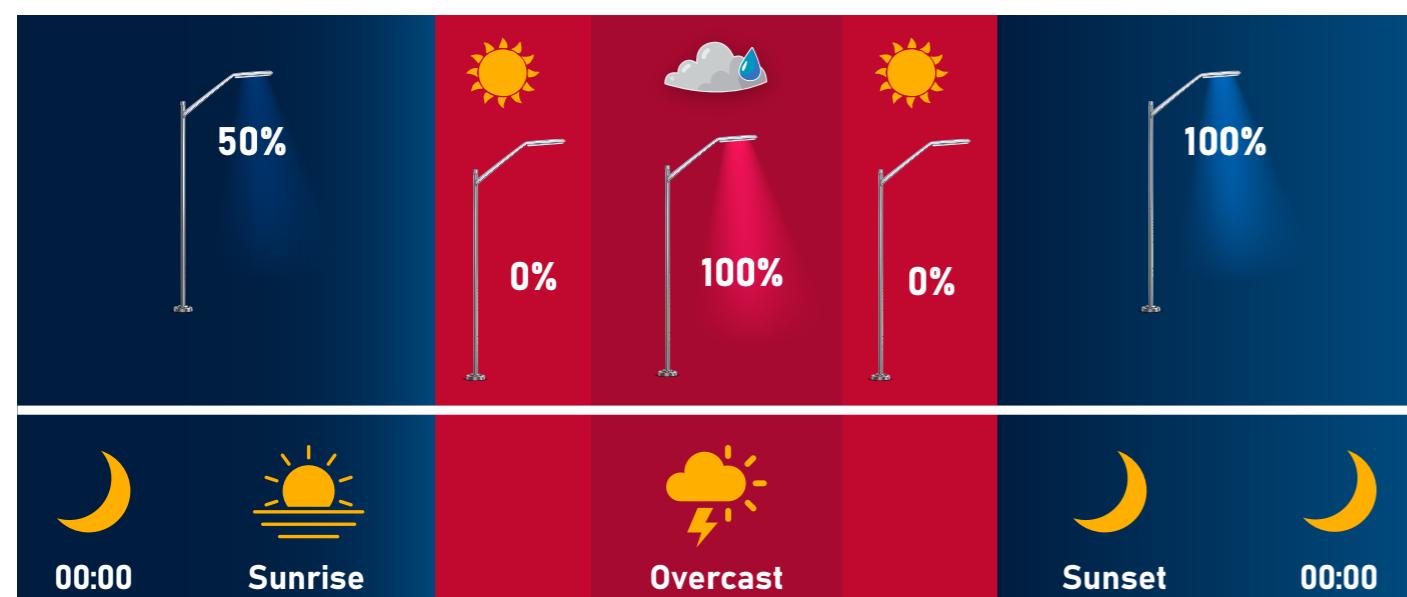
In addition to the astronomical time clock, the **daylight control** feature ensures the desired lighting levels are maintained within specific time intervals.

For example, if the system detects insufficient natural lighting during an overcast midday, it automatically adjusts the intensity of artificial lighting to provide adequate illumination.

This profile is ideal for optimizing lighting and enhancing energy savings.

Device Updates and Remote Management

Candela offers the ability to remotely perform software updates for all devices via the LoRaWAN protocol. This ensures that the system remains constantly up-to-date without the need for physical intervention in the field.

50%				100%
	0%	100%	0%	
00:00	Sunrise	Overcast	Sunset	00:00

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Advantage of Multiple Luminaire Control with a Single Control Unit

In the Candela system, it is possible to control 5 luminaires with a single terminal control unit placed to lighting poles having more than one luminaire.

Take a Closer Look at the candela Street Lighting Control System

With the wireless lighting control systems of Candela, you can work with all DALI and DALI-2 compatible luminaires. You can also obtain crucial data such as the energy level consumed by the luminaires, total operating time, mains voltage and frequency. Moreover, you can control the relevant luminaires wirelessly. In addition to saving energy, with Candela, you can also reduce your maintenance and spare parts costs by making use of lighting fixtures for a longer period of time.

★ LoRaWAN

The Candela Wireless Lighting Control System operates using the LoRaWAN protocol, which provides long-range communication with low energy consumption. This system supports both ABP (Activation By Personalization) and OTAA (Over-The-Air Activation) modes, catering to various usage scenarios. Candela offers flexible usage options by supporting Class A, Class B, and Class C operating modes to meet different needs:

Class A: It is ideal for the lowest energy consumption, and the device can only receive data for a short period after sending data.

Class B: Allows data reception at scheduled intervals, enabling the device to communicate more frequently.

Class C: Operates in a continuously active receiver mode, which consumes the most energy but allows instant data transmission.

Thanks to these features, Candela can be used in a wide range of applications, from industrial facilities to smart city projects. Its easy installation and flexible operating modes ensure energy efficiency and ease of management.

Products

2 201 IOT Monitor Module — IOT

Universal input module that allows flexible use and enables monitoring of third party systems over wireless LoRaWAN networks.

Features

- Ability to work on a standalone basis
- Compatible with DALI and DALI2
- Compatible with ISM frequency bands valid in EU868 (Turkey and Europe) and other countries
- 128 Bit AES encryption
- Real time clock
- LoRaWAN Class A
- Battery-powered
- Low power consumption
- Operating temperature between -25C/+65 °C
- Communication up to 5 km in open areas
- IP67 enclosure
- 4x digital input
- Optional Integrated GPS
- Ability to make up to 254 different virtual groups
- Simultaneous multi-channel communication over 3 different channels

1 101 Lighting Control Unit

Wireless LoRaWAN lighting control unit with Zhaga and Nema connectors compliant with DALI and DALI2 standards.

Features

- Ability to work on a standalone basis
- Compatible with DALI and DALI2
- Zhaga and Nema connection interface
- Compatible with ISM frequency bands valid in EU868 (Turkey and Europe) and other countries
- Integrated light sensor
- 128 Bit AES encryption
- Real time clock
- Operating temperature between -25C/+65 °C
- Communication up to 5 km in open areas
- IP66 enclosure
- LoRaWAN Class C
- Optional Integrated GPS
- Ability to make up to 254 different virtual groups
- Simultaneous multi-channel communication over 3 different channels

3 202 IOT Combo Module — IOT

Universal Input/Output module that allows flexible use and enables monitoring and control of third party systems over wireless LoRaWAN networks.

Features

- Ability to work on a standalone basis
- Programmable scenario
- Compatible with ISM frequency bands valid in EU868 (Turkey and Europe) and other countries
- 128 Bit AES encryption
- Real time clock
- 220V / Battery-powered
- Operating temperature between -25C/+65 °C
- Communication up to 5 km in open areas
- IP67 enclosure
- 4x digital input
- 1 x 0-10V / 4-20 mA analog input
- LoRaWAN Class A and C
- 1x dry contact
- Optional Integrated GPS
- Ability to make up to 254 different virtual groups
- Simultaneous multi-channel communication over 3 different channels

4 203 Sensor Interface Module — IOT

Sensor interface module that allows flexible use and enables monitoring of third party temperature, CO_2, noise, pressure, humidity, motion, air quality sensors over wireless LoRaWAN networks.

Features

- Ability to work on a standalone basis
- Compatible with ISM frequency bands valid in EU868 (Turkey and Europe) and other countries
- 128 Bit AES encryption
- Real time clock
- 220V / Battery-powered
- Low power consumption
- Operating temperature between –25C / +65 °C
- Communication up to 5 km in open areas

- IP67 enclosure
- 2x digital input
- 2 x 0-10V / 4-20 mA analog input
- LoRaWAN Class A and C
- Optional Integrated GPS
- Ability to make up to 254 different virtual groups
- Simultaneous multi-channel communication over 3 different channels

5 301 Zone Control Unit

Zone control module that enables communication with LoRaWAN terminal units and can communicate with the central control unit through standard Ethernet TCP/IP and GSM networks which are able to control 600 terminal units.

Features

- Compatible with ISM frequency bands valid in EU868 (Turkey and Europe) and other countries
- 128 Bit AES encryption
- Operating temperature between –25C / +65 °C
- Communication up to 5 km in open areas
- IP67 enclosure
- LoRaWAN unidirectional or bidirectional communication support

- LoRaWAN Class A/B and C support
- PoE IEEE 802.3 af/at supported
- 10/100M Ethernet and GPRS/3G/4G connection supported
- Power supply: DC jack, PoE and internal LiFePO4 battery
- Operating temperature between –40°C / +75°C
- Watertightness level: IP67

Candela GUI

6
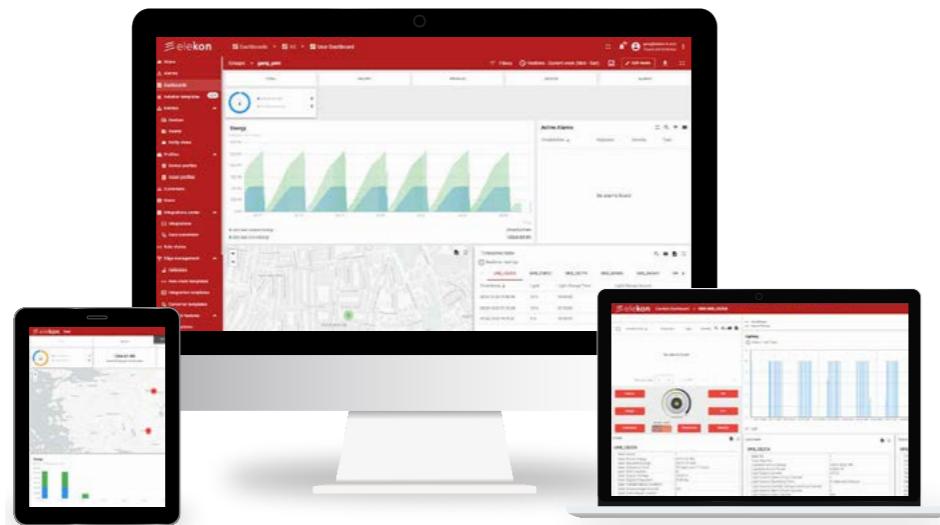
The Candela IoT Platform management software, built using the global platform ThingsBoard, allows users to easily control the system in cloud or local environments. Optionally, it can be integrated with all MQTT-supported interfaces such as Tridium and Niagara 4.

Features

- Display of street lamps on the map
- Working with different color codes. Display of error, warning and alerts.
- Reading the information of each lamp
- Reading group-based power consumptions
- Continuous real-time monitoring of energy consumption
- Switch to map or satellite view
- Zoom-in and zoom-out functions

Planning

- Grouping of lamps (possibility to define 255 groups)
- Lighting profile management (creating, updating, listing)
- Creating different types of lighting profiles
  - Manual determination of illumination level
  - Daily-time based profile (same or different profile for every day of the week, for holidays)
  - Assigning a profile with reference to sunrise and sunset
  - Assign profiles to lamps or groups
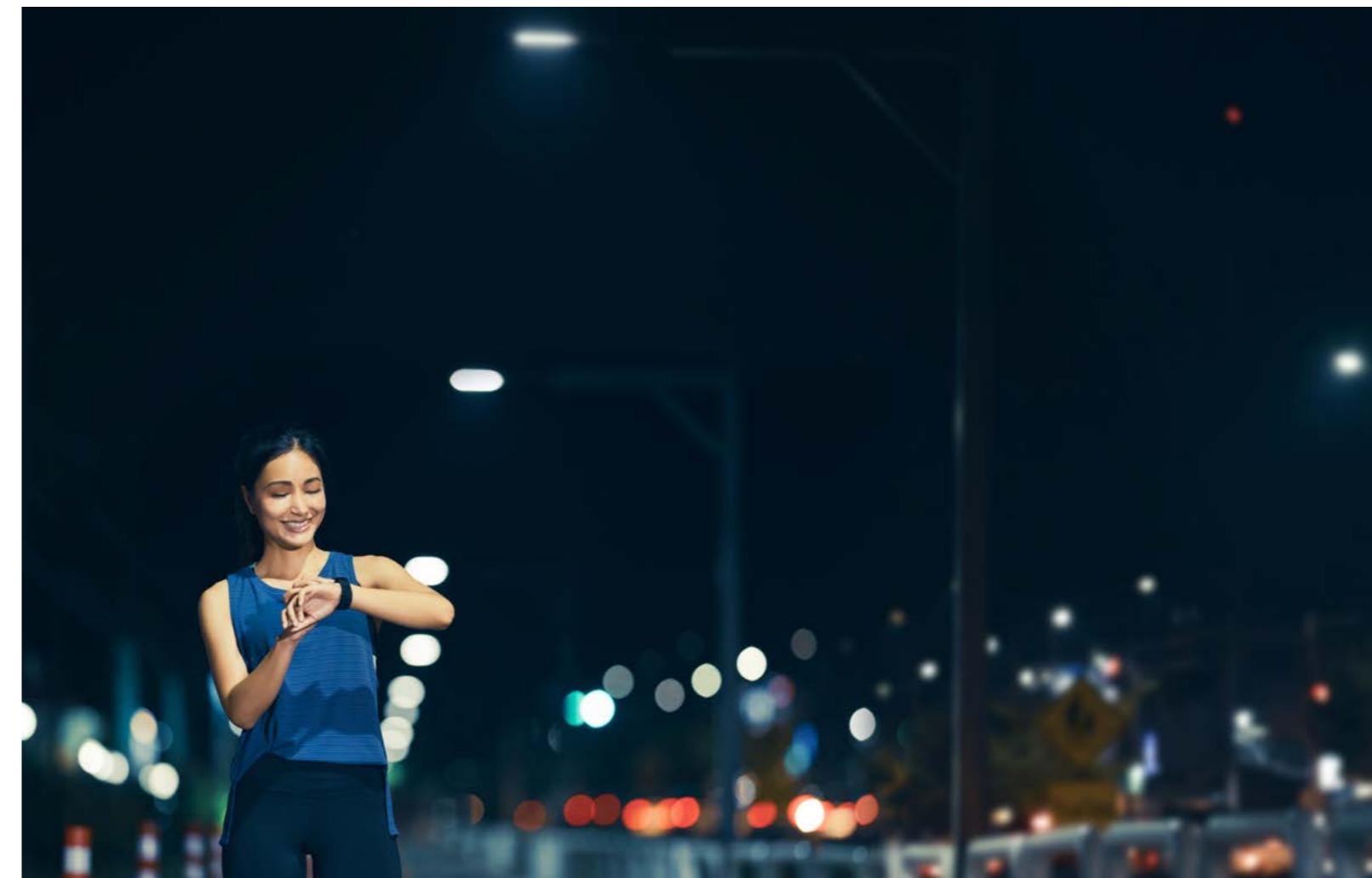
Data Analysis / Reporting

- Ability to select a date range for analysis
- Table or graphic display
- Display of total energy consumption in the selected range, ability to compare
- Tabular listing of all errors with timestamp (Node connection error, armature connection error, DALI error)
- Filtering based on error type, serial number, region, type and date
- Report generation

Inventory Tracking

- Node-based tracking of the status of end elements such as lighting poles and lamps
- New lamp, pole, etc. Adding/deleting/updating device.
- Listing of executed maintenance
- Entering and querying a new maintenance time
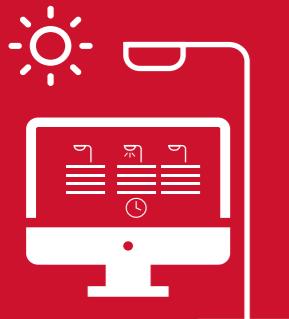
IoT

Candela wireless lighting control system transforms inefficient street and road lighting systems into smart systems with wireless communication for each and every luminaire.

Lighting systems, cities and agricultural areas become smarter, more efficient and more sustainable with Candela IoT products.

Meet A Unique
Solution That Fulfills
**Expectations
Beyond Needs!**

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Elekon: Journey Through Time

MART MARCH 2009
2009 yılı Helvar En İyi Distribütörlük Ödülü alındı.
Best Distributorship Award of Helvar for 2009 was received.

HAZİRAN JUNE 2011
ISO 9001 Quality Management System Certificate by Bureau Veritas
Bureau Veritas ISO 9001 Quality Management System Certificate was obtained.

ARALIK DECEMBER 2012
ERP Altyapısı kurulumu gerçekleştirildi.
ERP Infrastructure was installed.

MART MARCH 2014
LÖSEV LÖSANTE Yetişkin ve Çocuk Hastanesi / UTC Entegre Güvenlik Sistem çözümleri ve Helvar ürünleri kullanıldı.
LÖSEV LÖSANTE Adult and Children Hospital/ UTC Integrated Security System Solutions and Helvar products were used.

MART MARCH 2016
Orjin Maslak / IP Tabanlı ilk entegre güvenlik ve otomasyon projesi yapıldı.
Orjin Maslak/ The first IP-based integrated security and automation project was completed.

AĞUSTOS AUGUST 2017
Eskişehir Şehir Hastanesi / Avrupa'nın En İyi Sağlık Projesi ödülü alan proje başladı.
Eskişehir City Hospital / The project which received Europe's Best Health Project Award has been launched.

OCAK JANUARY 2018
UTC Fire and Security "Ekstra Mile 2017" Ödülü alındı.
UTC Fire and Security "Extra Mile 2017" Award.

NİSAN APRIL 2019
TAI / Savunma sanayiinde ilk kampüs projesi gerçekleştirildi.
TAI / The first campus project in the defence industry was applied.

MART MARCH 2021
İstanbul Finans Merkezi - TCMB / Avrupa'nın en yüksek binası için Helvar aydınlatma otomasyon çözümleri tercih edildi.
Istanbul Financial Center - TCMB / Helvar lighting automation solutions were chosen for the tallest building in Europe.

HAZİRAN JUNE 2006
Elekon faaliyetlerine başladı.
Elekon started its activities.

HAZİRAN JUNE 2008
Mardan Palace / İlk büyük tematik otel projesi yapıldı.
Mardan Palace / The first thematic hotel project completed.

HAZİRAN JUNE 2009
Çeşme Port / İlk entegre güvenlik sistemleri projesi yapıldı.
Çeşme Port / The first integrated security system project completed.

OCAK JANUARY 2012
İlk bayilik sözleşmesi imzalandı.
The first dealership agreement was signed.

EKİM OCTOBER 2013
Cumhurbaşkanlığı Külliyesi / Türkiye'nin en büyük ilk DALI projesi yapıldı.
Presidential Complex / The biggest DALI projects of Turkey completed.

ARALIK DECEMBER 2015
Mackwell ile distribütörlük sözleşmesi imzalandı.
The distributorship contract was signed with Mackwell.

MART MARCH 2016
Isparta Şehir Hastanesi / İlk şehir hastanesi projesine başlandı.
Isparta City Hospital / The first city hospital project was started.

TEMMUZ JULY 2017
İstanbul Yeni Havalimanı Hava Trafik Kontrol Kulesi / Helvar Aydınlatma ve Otomasyon Sistemi.
New Istanbul Airport Air Traffic Control Tower / Helvar Lighting and Automation System.

ŞUBAT FEBRUARY 2018
Roketsan / Savunma sanayiinde ilk proje gerçekleştirildi.
Roketsan / The first project in the defence industry was utilized.

HAZİRAN JUNE 2019
Cumhurbaşkanlığı Millet Kütüphanesi projesi ile Helvar En İyi Proje Ödülü alındı.
Elekon was honored by Helvar with the Best Project Award for the Nation's Library project.

NİSAN APRIL 2023
Gloria Serenity Resort / Helvar'ın Otel Odası Otomasyon Sistemi'nin Türkiye'de uygulandığı ilk projeye başlandı.
Gloria Serenity Resort / Turkey's first project in which Helvar's Guest Room Management System is implemented was began.

2006

TEMMUZ JULY 2006
İlk distribütörlük sözleşmesi imzalandı.
The first distributorship contract was signed.

ARALIK DECEMBER 2008
GE Security ile distribütörlük sözleşmesi imzalandı.
The distributorship contract was signed with GE Security.

MART MARCH 2010
2010 yılı Helvar En İyi Distribütörlük Ödülü alındı.
Best Distributorship Award of Helvar for 2010 was received.

HAZİRAN JUNE 2012
Zorlu Center / Aydınlatma Kontrol sistemlerinin entegre edildiği ilk üst entegrasyon projesi yapıldı.
Zorlu Center / The first superior integration project to which the lighting control systems are integrated completed.

MART MARCH 2014
Frankfurt Light and Building Fuarı DALI Ödülleri, İkinci En İyi Firma Ödülü alındı.
Frankfurt Light and Building Fair DALI Awards, Second Best Company Award was received.

DALI AWARD 2014

KASIM NOVEMBER 2017
Kale / Türkiye'nin en büyük entegre yangın ve acil anons projesi yapıldı.
Kale / Turkey's biggest integrated fire and public announce project was realized.

NİSAN APRIL 2018
Oyak Renault / Türkiye'deki ilk büyük çaplı fabrika enerji verimliliği dönüşüm projesi gerçekleştirildi.
Oyak Renault / Turkey's first large-scale factory energy efficiency transformation project was carried out.

OCAK JANUARY 2020
Dünyanın en büyük kargo binası olan THY Turkish Cargo'nun aydınlatma otomasyon çözümünde Helvar tercih edildi.
Helvar's lighting automation solution was chosen for THY Turkish Cargo project, the world's largest cargo building.

NİSAN APRIL 2022
Çukurova Bölgesel Havalimanı / Elekon'un altıncı havalimanı imzası olan, Türkiye'nin en büyük dördüncü havalimanı projesine başlandı.
Çukurova Airport / Turkey's fourth largest airport project, which is also Elekon's sixth airport implementation, was started.

TEMMUZ JULY 2008
Azerbaycan Sahil Tesisleri / Azerbaycan'da ilk proje yapıldı.
Azerbaijan Beach Facilities / The first project in Azerbaijan completed.

TEMMUZ JULY 2009
İstanbul AHL Serbest Bölge'de ilk faaliyet gerçekleştirildi.
The first activities were realized in Istanbul AHL Free Trade Zone.

ŞUBAT FEBRUARY 2012
Haydar Aliyev Kültür Merkezi / Azerbaycan'ın simgesi olan projede Helvar Aydınlatma Otomasyon Sistemi yapıldı.
Haydar Aliyev Cultural Centre / Helvar's lighting automation system was set up in the project as a symbol of Azerbaijan.

HAZİRAN JUNE 2013
İstanbul şubesi açıldı.
Istanbul branch was placed.

OCAK JANUARY 2016
Finansbank Kristal Kule Güneş Takip Sistemi kurulan ilk proje yapıldı.
Finansbank Kristal Kule/ The first project through which the solar tracking system was set up.

OCAK JANUARY 2017
İstanbul Yeni Havalimanı / Helvar Aydınlatma Otomasyon Sistemi kuruldu.
New Istanbul Airport / Helvar Lighting and Automation System was set up.

EYLÜL SEPTEMBER 2017
Nurol Life Seyrantepe / Yangın Algılama, Kartlı Geçiş, CCTV ve Aydınlatma Otomasyon Sistemi.
Nurol Life Seyrantepe / Fire Detection, Card Pass, CCTV and Lighting Automation System.

MAYIS MAY 2019
Galataport İstanbul / İlk liman projesine başlandı.
Galataport İstanbul / The first harbor project was started.

EKİM OCTOBER 2020
Başakşehir Çam & Sakura Şehir Hastanesi / En büyük metrekareli şehir hastanesi projesi gerçekleştirildi.
Başakşehir Çam & Sakura City Hospital / The city hospital project having the most extensive square meter was implemented.

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We've achieved so much in eighteen years...

LoRaWAN® **DALI** **DALI 2** niagara⁴ **TRIDIUM** **YERLİ ÜRETİM** CE

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